

**WHAT IS CLAIMED IS:**

1           1.     A control signal transmitting method in a video player having an integrated circuit  
2 (IC) for processing video/audio signals and a microprocessor generating control signals to control  
3 the IC, the control signal transmitting method comprising the steps of:

4           mapping serial data corresponding to possible control states of the video/audio signal  
5 processing IC onto a predetermined control signal, and storing the mapped data in a lookup table;

6           reading serial data corresponding to a control state of the video/audio signal processing IC  
7 requested by the microprocessor, from the lookup table; and

8           transmitting the serial data to the video/audio signal processing IC, being synchronized to a  
9 clock signal.

10          2.     The control signal transmitting method of claim 1, wherein the mapping process  
11 comprises the steps of:

12           grouping possible control states into a first group having necessary control states  
13 corresponding to the operation modes of the video player, and other groups having control states  
14 corresponding to selective operation modes attached to the operation modes; and

15           mapping serial data corresponding to each of the control states.

1           3.     The control signal transmitting method of claim 2, wherein the first group comprises  
2     control states related to video recording/reproducing/ electronic-to-electronic (EE), and audio  
3     recording/reproducing/EE.

1           4.     The control signal transmitting method of claim 3, wherein the first group further  
2     comprises control states related to head amp recording/reproducing/ recording pause.

1           5.     The control signal transmitting method of claim 4, wherein the first group further  
2     comprises control states related to input channel selection.

6. The control signal transmitting method of claim 5, wherein the mapping states of the first group stored in the lookup table comply with the following table:

Group address	Bit address								Control state
	8	7	6	5	4	3	2	1	
Group 1							0	0	VIDEO REC
							0	1	VIDEO PB
							1	0	VIDEO EE
							1	1	PROHIBIT
					0	0			AUDIO REC
					0	1			AUDIO PB
					1	0			AUDIO EE
					1	1			PROHIBIT(Y-TEST MODE)
			0	0					HA REC
			0	1					HA PB
			1	0					HA REC PAUSE
			1	1					PROHIBIT(F-TEST MODE)
	0	0							(VIDEO/AUDIO) SW INPUT1
	0	1							(VIDEO/AUDIO) SW INPUT2
	1	0							(VIDEO/AUDIO) SW INPUT3
	1	1							PROHIBIT

7. The control signal transmitting method of claim 2, wherein in the mapping process, control states related to the recording speed of a video/audio signal, detail amount, noise remove amount, etc. are grouped into a second group and mapped.

8. The control signal transmitting method of claim 4, wherein the mapping states of the second group stored in the lookup table comply with the following table:

Group address	Bit address								Control state
	8	7	6	5	4	3	2	1	
Group 2							0	0	(VIDEO/AUDIO) SP
							0	1	(VIDEO/AUDIO) LP
							1	0	(VIDEO/AUDIO) 3P
							1	1	CARRIER SHIFT ON * SP
					0	0			DETAIL WEAK / NC1 WEAK
					0	1			DETAIL MEDIUM/ NC1 MEDIUM
					1	0			DETAIL STRONG / NC1 STRONG
					1	1			PROHIBIT
			0	0					YNR OFF
			0	1					YNR WEAK
			1	0					YNR MEDIUM
			1	1					YNR STRONG
	0								AUTO(VXO/XO) /DOC AUTO
	1								FORCED XO /DOC OFF
	0								CG NORMAL /NORMAL PB
	1								CD STOP /TRICK PB

9. The control signal transmitting method of claim 2, wherein in the mapping process, control states related to the mixing ratio of luminance/chromaticity signal, recording current control amount, recording equalize control amount, etc., are grouped into a third group and mapped.

10. The control signal transmitting method of claim 4, wherein the mapping states of the third group stored in the lookup table comply with the following table:

Group address	Bit address								Control state
	8	7	6	5	4	3	2	1	
Group 3							0	0	Y/C MIX RATIO Y-RM: +1 Db/ PB-EQ LOW-SIDE BAND: 1(low)
							0	1	Y/C MIX RATIO Y-RM: 0 Db/ PB-EQ LOW-SIDE BAND: 1
							1	0	Y/C MIX RATIO Y-RM: -1 Db/ PB-EQ LOW-SIDE BAND: 1
							1	1	Y/C MIX RATIO Y-RM: -2 Db/ PB-EQ LOW-SIDE BAND: 1(high)
						0			REC CURRENT :0db /ENV DET SENSITIVITY: low
						1			REC CURRENT :+2db /ENV DET SENSITIVITY: high
					0				REC EQ SLOPE: Gentle /PB-EQ HIGH-TRAP:7.5MHz
					1				REC EQ SLOPE: Steep /PB-EQ HIGH-TRAP:8.5MHz
				0					Chroma DET OFF
				1					Chroma DET ON
			1						SYNC SLICE LEVEL = SYNC TIP SIDE
			0						SYNC SLICE LEVEL = PEDESTAL SIDE
		0							REC C-COMB ON
		1							REC C-COMB OFF
	1								SIGNAL
	0								NO-SIGNAL

1           11.     The control signal transmitting method of claim 2, wherein each group has at least  
2     one sub group including control states having common characteristics, and the sub groups are  
3     mapped corresponding to at least one bit in N bits assigned to the group the sub groups belong to.

1           12.     The control signal transmitting method of claim 2, wherein in the reading process,  
2     serial data of the first group corresponding to the operation modes of the video player is necessarily  
3     read and serial data of the other groups is selectively read according to the control state, whenever  
4     a request for transmitting a control signal occurs.

1           13.     The control signal transmitting method of claim 12, wherein in the transmitting  
2     process, the first group is preferentially transmitted.

1           14.     The control signal transmitting method of claim 1, wherein in the transmitting  
2     process, the serial data is transmitted being synchronized to a synchronization signal during an  
3     interval where a chip select signal (CS) indicating a selection state of the video/audio IC is enabled.

1           15.     A control signal receiving method in a video/audio processing IC, which is applied  
2     to a video player, internally has a plurality of blocks, and controls the operation of each block in

3 response to a control signal applied from the outside, the control signal receiving method comprising  
4 the steps of:

5 mapping control signals corresponding to possible control states and storing the mapped  
6 control signals in a lookup table;

7 receiving serial data corresponding to a control state requested by the video player; and

8 generating control signals corresponding to the received serial data referring to the lookup  
9 table.

16. A control signal transmitting apparatus in a video player having an IC for processing  
video/audio signals and a microprocessor generating control signals to control the IC, the control  
signal transmitting apparatus comprising:

a lookup table for storing mapped serial data corresponding to possible control states of the  
video/audio processing IC; and

a shift register reading serial data corresponding to the control states of the video/audio  
processing IC requested by the microprocessor, and outputting the data serially being synchronized  
to a clock signal.

17. The control signal transmitting apparatus of claim 16, wherein the lookup table has  
serial data recorded by a method comprising the steps of:

3           grouping possible control states of the video/audio processing IC into a first group having  
4           necessary control states corresponding to the operation modes of the video player, and other groups  
5           having control states corresponding to selective operation modes attached to the operation modes;  
6           mapping serial data corresponding to each of the control states; and  
7           storing the mapped serial data in said look-up table.

1           18.    The control signal transmitting apparatus of claim 16, wherein the shift register  
2           necessarily reads serial data of the first group corresponding to the operation modes of the video  
3           player from the lookup table and serial data of the other groups is selectively read according to the  
4           control state, whenever a request for transmitting a control signal occurs.

5           19.    A video/audio processing IC, which is applied to a video player, internally has a  
6           plurality of blocks, and controls the operation of each block in response to a control signal applied  
7           from the outside, the video/audio processing IC comprising:

8           a latch for receiving serial data corresponding to a control state requested by the video player;  
9           and

10          a decoder having a lookup table, wherein serial data corresponding to control signals  
11          corresponding to possible control states of the video/audio processing IC is mapped, and outputting  
12          control signals corresponding to serial data latched by the latch.



1           20.    The video/audio processing IC of claim 19, wherein the serial data is formed of a first  
2           group having necessary control states corresponding to the operation modes of the video player and  
3           the other group having control states corresponding to selective operation modes attached to the  
4           operation modes, and the decoder preferentially decodes control signals corresponding the first  
5           group.

21. A video player, comprising:  
  
a microprocessor generating control signals;  
  
a first lookup table for encrypting said control signals allowing said control signals to be  
transmitted over a single electrical line in seriatim; and  
  
an audio/video integrated circuit (A/V IC) chip receiving control signals in seriatim via a  
single electrical pin, said control signals control said A/V IC chip.

1           22. The video player of claim 21, said A/V IC chip comprising a second lookup table for  
2           decrypting said control signals allowing said decrypted control signals to control said A/V IC chip,  
3           said second lookup table being inverse to said first lookup table.

1           23. The video player of claim 21, wherein said microprocessor outputs encrypted control

2 signals in seriatim using a single electrical pin, said first lookup table being stored in a memory  
3 electrically connected to said microprocessor.

1 24. The video player of claim 21, wherein said A/V IC chip comprises a shift register for  
2 converting incoming encrypted serial control signals into a plurality of parallel control signals.

1 25. The video player of claim 21, wherein said microprocessor outputs a plurality of control  
2 signals in parallel and unencrypted.

1 26. The video player of claim 25, further comprising a parallel to serial converter chip, said  
2 parallel to serial converter chip receives said unencrypted control signals in parallel from said  
3 microprocessor and outputs encrypted control signals in seriatim to said A/V IC chip, said parallel  
4 to serial converter chip comprising said first look up table for encrypting said control signals.

1 27. The video player of claim 26, said parallel to serial converter chip further comprises a  
2 shift register to synchronize serial encrypted control signals transmitted from said parallel to serial  
3 converter chip to a clock signal transmitted from said microprocessor.

1 28. The video player of claim 21, further comprising an input panel allowing a user to input

2 a mode of operation of said video player, said microprocessor outputs control signals based on said  
3 user's input and based on signals output from said A/V IC chip.

1 29. The video player of claim 21, wherein said microprocessor outputs a chip select signal  
2 to enable said A/V IC chip and a clock signal to said A/V IC chip, said clock signal being  
3 synchronized to said in seriatim encrypted control signals.

30. The video player of claim 29, wherein said A/V IC chip comprises three electrical input  
pins, one for the control signals, one for the clock signal, and the last for the chip select signal.

31. A method of transmitting control signals in a video player, said method comprising the  
steps of:

generating first and second lookup tables for encrypting and decrypting respectively control  
4 signals used to control an audio/video integrated circuit (A/V IC) chip, said second lookup table  
5 being an inverse of said first lookup table;

6 transmitting control signals in parallel and a clock signal from a microprocessor;

7 encrypting said parallel control signals via said first look up table located in a parallel to  
8 serial converter chip disposed between said microprocessor and said A/V IC chip;

9 converting said parallel control signals into a serial control signal;

synchronizing said serial control signal with said clock signal;

receiving said encrypted serial control signal via a first input pin on said A/V IC chip and

receiving said clock signal via a second input pin on said A/V IC chip;

converting said serial control signal into a plurality of parallel control signals via a shift register in said A/V IC chip;

decrypting said encrypted control signals using said second lookup table located in said A/V IC chip; and

controlling a plurality of blocks within said A/V IC chip via said plurality of parallel decrypted control signals.

32. The method of claim 31, wherein said parallel control signals transmitted from said microprocessor is based on a mode selection input by a user and on signals received from said A/V IC chip.

33. A method of transmitting control signals in a video player, said method comprising the steps of:

generating first and second lookup tables for encrypting and decrypting respectively control signals used to control an audio/video integrated circuit (A/V IC) chip, said second lookup table being an inverse of said first lookup table;

6 transmitting a encrypted serial control signal and a clock signal synchronized to said  
7 encrypted serial control signal from said microprocessor to said A/V IC chip over a pair of electrical  
8 connection lines;

9 receiving said encrypted serial control signal via a first input pin on said A/V IC chip and  
10 receiving said clock signal via a second input pin on said A/V IC chip;

11 converting said serial control signal into a plurality of parallel control signals via a shift  
12 register in said A/V IC chip;

13 decrypting said encrypted control signals using said second lookup table located in said A/V  
14 IC chip; and

15 controlling a plurality of blocks within said A/V IC chip via said plurality of parallel  
16 decrypted control signals.

34. The method of claim 33, wherein said encrypted serial control signal transmitted from  
2 said microprocessor is based on a mode selection input by a user, on signals received from said A/V  
3 IC chip and information gleaned from said first lookup table.

1 35. The method of claim 34, said first lookup table residing in a read only memory  
2 electrically connected to said microprocessor.